(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date 24 December 2003 (24.12.2003)

PCT

(10) International Publication Number WO 03/106910 A1

(51) International Patent Classification7:

(21) International Application Number: PCT/JP03/07638

(22) International Filing Date: 17 June 2003 (17.06.2003)

(25) Filing Language:

English

F28F 9/26

(26) Publication Language:

English

(30) Priority Data:

2002-176896 60/394,879

18 June 2002 (18.06.2002) JР 11 July 2002 (11.07.2002)

(71) Applicant (for all designated States except US): SHOWA DENKO K.K. [JP/JP]; 13-9, Shiba Daimon 1-chome, Minato-ku, Tokyo 105-8518 (JP).

(72) Inventor; and

- (75) Inventor/Applicant (for US only): MANAKA, Hideaki [JP/JP]; c/o SHOWA DENKO K.K., OYAMA REGIONAL OFFICE, 480, Inuzuka 1-chome, Oyama-shi, Tochigi 323-8678 (JP).
- (74) Agents: HIBI, Norihiko et al.; c/o KISHIMOTO & CO., 3rd Floor, Inaba Building, 13-18, Nishishinsaibashi 1-chome, Chuo-ku, Osaka-shi, Osaka 542-0086 (JP).

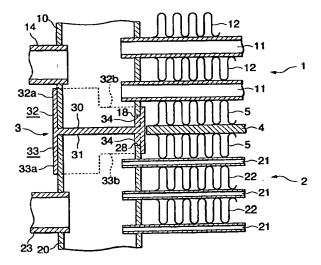
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: UNIT-TYPE HEAT EXCHANGER



(57) Abstract: A unit-type heat exchanger for use as a condenser in motor vehicle air conditioners and an oil cooler for various oils for use in motor vehicles. An oil cooler 1 and a condenser 2 are arranged one above the other and assembled into a unit. Each of these components 1, 2 has two pipelike headers 10, 20 arranged in parallel to each other at a spacing, and a plurality of parallel heat exchange tubes 11, 21 joined at opposite ends thereof to the two headers 10, 20. The adjacent oil cooler 1 and condenser 2 have ends thereof positioned in proximity to each other and connected to each other by connectors 3. Each of the connectors 3 is provided at opposite sides thereof with respective recessed portions 30, 31 for opposed ends of the headers 10, 20 to be fitted therein, and these header ends are fitted in the respective recessed portions 30, 31 and joined to the connector 3. The unit-type heat exchanger is adapted to prevent mixing of the fluids flowing inside the oil cooler 1 and the condenser 2, respectively.

